care must be exercised to avoid the introduction into the latter of even as little as 1 milligramme of an ammonium salt—that is to say, it is extremely advisable to wash the solution of alkaloid in volatile solvent with water.

From this point of view it is somewhat unfortunate that in the pharmacopœial assay processes for belladonna leaf and tincture and dry extract of belladonna no directions are given for washing the chloroformic solution of alkaloid before evaporation and titration, while it is certainly very difficult to understand why the precaution which was omitted in these cases should have been taken in the assay of liquid extract of belladonna. With regard to aconite and its preparations, while the prescribed filtration of the ether, if properly carried out, appears to render any appreciable error unlikely, yet great care must be taken that none of the aqueous layer passes through the filter, otherwise owing to the high molecular weight of aconitine, a very serious error may result.

THE VARIATION CLAUSE OF THE FOOD AND DRUGS ACT.*

SOME REASONS FOR THE EXISTENCE OF THE CLAUSE AND AGAINST ITS REPEAL.

J. H. BEAL, URBANA, ILL.

Section Seven of the Federal Food and Drugs Act declares that a drug shall be deemed to be adulterated if, when "sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as laid down in the United States Pharmacopœia or National Formulary official at the time of investigation."

To this declaration the so-called variation clause is attached in the form of a proviso which reads, *"Provided,* That no drug defined in the United States Pharmacopœia or National Formulary shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box or other container thereof, although the standard may differ from that determined by the test laid down in the United States Pharmacopœia or National Formulary."

The meaning of the foregoing somewhat involved pharaseology is, in brief, that when a title found in the United States Pharmacopœia or National Formulary is used without qualification or explanation, the article sold thereunder must be of strictly U. S. P. or N. F. quality, but that such a title may be used (under the proviso) upon an article of a different standard if the label plainly indicates the standard to which it conforms.

Identical or very similar provisions are found in many of the state food and drug acts, so that arguments for or against the existence of the variation clause of the Federal law will have equal application to state laws.

In view of the fact that the repeal of the variation clause has been demanded upon the ground that it permits the sale of inferior and adulterated products under official titles, it may be profitable to consider some of the reasons which

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lead to its inclusion in the law, and also some of the reasons why its repeal would work unnecessary hardship to the chemical arts and industries and be inimical to the legitimate interests of pharmacy and medicine.

(1) *The Pharmacopœia is a book of limited standards properly applicable to drugs and chemical products only when used in pharmacy and medicine.*

The purpose of the food and drug laws is to prevent fraud and deception in the sale of drugs and medicinal products, not to limit the proper activities of manufacturing pharmacists or chemists or to restrict the trade in chemical or medicinal products within narrow, specified channels.

The Pharmacopœia appropriates titles previously devised and generally used in the arts and industries and attaches to them special meanings and limitations which, though sufficient for pharmacopœial processes and purposes, are not practicable when applied to substances used in the chemical arts and industries in which by far the large proportion of such substances are consumed.

The Revision Committee of the Pharmacopœia in standardizing these substances standardizes them solely for medicinal purposes or for use in the official formulæ and processes. Many of them have other and important uses outside of pharmacy and medicine, and it would be monstrous if the Pharmacopœia by the adoption of well known and commonly used titles could thereafter prevent their use in connection with products to which they had always been attached unless such products were modified to fit the pharmacopœial standards.

The framers of the official standards have themselves recognized the unfitness of these standards for commercial and technical purposes by the specific declaration in the preface to the Pharmacopœia that, "The standards of purity and strength prescribed in the text of the Pharmacopœia are intended to apply to substances which are used solely for medicinal purposes, and when professedly bought, sold, or dispensed as such."

The openly alleged purpose in making the variation clause a part of the Food and Drugs Act was to give legal force and effect to this declaration from the preface to the Pharmacopœia. Consequently, the repeal of the variation clause at this time could hardly be interpreted in any other light than as showing the intention of Congress to reverse its former action, and to make of universal application the words of the statute that an article shall be deemed to be adulterated if, "when sold under or by a name recognized in the United States Pharmacopœia or National Formulary, it differs from the standard of strength, quality or purity, as laid down in the United States Pharmacopœia or National Formulary official at the time of investigation."

(2) *The variation clause is essential to the utilization of certain natural products in a perfectly proper and legitimate manner.*

Certain alkaloid-bearing drugs are properly required by the United States Pharmacopœia to contain specified percentages of their respective alkaloids when dispensed as medicines or when used in the preparation of official tinctures and fluidextracts. Nature, however, does not always supply drugs which contain exactly the specified content of alkaloid. Sometimes the percentage is below and sometimes above the official specifications, and a drug which is too strong is just as much illegal as one which is too weak.

While such drugs are unfitted for medicinal use in their natural condition,

they can be brought to the proper strength by grinding and mixing those which are above with those which are below the official requirements, or they can be utilized for the manufacture of the free alkaloids. These are perfectly proper and legitimate uses of such drugs, but in the absence of a variation clause in the Food and Drugs Act they could not lawfully be imported or transported in interstate commerce for these purposes.

(3) *The restriction of medicaments to one particular standard which could not be varied from under any circumstances, would be an unwarranted interference with the freedom of choice of medical practitioners who might prefer a different standard.*

Physicians and schools of medicine are by no means in accord as to the best forms of particular medicaments, and forms which are preferred by certain schools are condemned by others. The only proper condition of the law is one which will permit each physician to purchase or to prescribe that which in his judgment is the best.

For example, the Spirit of Nitrous Ether was formerly prepared by the action of nitric acid on ethyl alcohol in the presence of metallic copper, whereas the present official process requires it to be made by reaction between ethyl alcohol, sodium nitrite and sulphuric acid. Rightly or wrongly, many physicians insist that the old process yielded a spirit containing different by-products and therapeutically much superior to that produced by the present method of manufacture, and such physicians will not knowingly use a preparation made by the formula now official.

There can be no good reason why those who prefer the older product should not be permitted to have it, nor can there be any good reason why it should not be dealt in under a label which shows plainly that it was prepared according to the method formerly official.

Numerous other instances might be cited, where special forms of preparations preferred by particular physicians or particular schools could not be lawfully dealt in under their proper titles were it not that the variation clause makes them legal when they are appropriately labeled to show their variation from the present pharmacopœial standard.

(4) *The insistence upon an invariable standard which under no circumstances could be departed from requires the unwarranted assumption that the present official standards are perfect standards, and would operate to delay the introduction and use of improved and superior therapeutic products.*

A new revision of the Pharmacopœia is issued approximately every ten years, and each revision shows many changes from the standards formerly official. Many, or perhaps most of these changes are proved to be necessary by experiments made and published long before the new volume appears, or even before the Revision Committee has been selected. By virtue of the variation clause the superior products resulting from the adoption of these changes are immediately available in commerce by the simple expedient of labeling them so as to show that they conform to a different standard.

Examples of improvement produced by changes in official formulas are found in the newer liquid preparations of the so-called heart-tonic series of drugs of which digitalis is typical. When the eighth decennial revision of the Phar-

macopœia appeared in 1905, no acceptable method of standardizing the preparations of these drugs had been worked out. Since that date, however, several fairly reliable methods of physiological standardization have been developed, by means of which it has been fully determined that the use of a stronger alcoholic menstruum will yield a product which is not only initially more active, but one which will deteriorate much less rapidly than one made with the official menstruum. The fortunate inclusion of the variation clause in the food and drug laws permitted these greatly superior products to become immediately available, whereas without this saving clause they could not have been marketed, except under new and unfamiliar titles, until after the publication of the ninth revision of the Pharmacopœia, which will probably appear some time during the present year.

A large list of other preparations might be named in which modifications of official formulas yield improved products, the superiority of which is attested by the fact that the modifications are later approved and adopted by the Revision Committee. In the majority of instances the new preparations involve the employment of more costly materials or of more expensive processes of manufacture, so that the changes are not suggested by a desire to debase or cheapen the products, but solely by the desire to provide the medical profession with more efficient therapeutic agents.

(5) *The repeal of the variation clause would make it impossible for the owner of a stock of drugs and chemicals to dispose of them in a lawful manner when the standards of the Pharmacopœia are altered.*

Sometime during the present year a new Pharmacopœia will become official, and will show some hundreds of changes from the standards now in force, which means that some hundreds of items of an ordinary drug stock will suddenly become illegal if offered for sale under their titles as these will appear in the new book. These articles were in full compliance with the legal standards when made or purchased, and without any act or fault of their owners have been converted into adulterated products by the change in standards.

A legitimate demand for the articles conforming to the former standard will still exist, but only by virtue of the continuance of the variation clause in the law will it be possible to dispense them under proper labels showing the standard to which they conform.

(6) *The abuses claimed to be due to the existence of the variation clause can be largely, if not entirely cured by a proper interpretation of the variation clause.*

The principal offense charged against the variation clause is that it permits the marketing of so-called grocers' drugs, as ammonia water, hydrogen peroxide solution, spirit of camphor, etc., of inferior quality by the device of stating their percentage strength upon the label, and that the purchaser is deceived for lack of knowledge as to what a proper preparation should be.

The fault here, however, is in permitting the use of a label which does not fully comply with the requirement that the "standard of strength, quality, or purity" shall be *"plainly stated"* on the label.

The clear intendment of the law is that a drug of other than U. S. P. or N. F. quality shall show upon its label the information necessary to enable a purchaser to form an intelligent judgment of its quality or purity, either by direct

reference to another standard or by statements which of themselves sufficientaly indicate its quality and purity.

What such statements would need to be must, of course, vary with the nature of the product and with the character of the persons to whom addressed. When placed upon products intended for use by trained chemists and pharmacists, statements indicating percentages of important constituents, or the activity of the preparation for certain purposes, would be sufficient to convey all the needed information, while in the case of articles intended for popular purchase and consumption some additional or different statements might properly be regarded as necessary.

This is an interpretation that I think the courts would recognize as being in accord with the spirit of the enactment, and one that if enforced will effectually protect the innocent purchaser against intentional fraud and deception.

STATE ANTI-NARCOTIC LAWS.

M. I. WILBERT.

The enactment of the Federal anti-narcotic law, December 17, 1914, has suggested to many the desirability of bringing about greater uniformity in state anti-narcotic laws and in a number of states bills have been introduced that are designed to bring the requirements of the state law into accord with the present Federal law.

While greater uniformity in laws designed to restrict the sale and use of narcotic drugs is no doubt desirable, there are several points that may well be considered by pharmacists before they undertake to endorse any one of the proposed uniform state anti-narcotic laws modeled after the Federal law of December 17, 1914.

Not the least important of these several points is the fact that the Federal anti-narcotic law, quite unlike the Federal food and drugs act, is applicable and is now uniformly in force in all parts of the United States and is by no means restricted, as is the food and drugs law, to Federal territories and to interstate traffic.

With this fact in mind it would be manifestly unnecessary to re-enact in the several states any part or all of the Federal anti-narcotic law. Such enactment would only tend to duplicate the penalties that might be imposed on a person for not complying with the law, as conviction under one law would make the same person guilty or amenable under the other.

An article published in Public Health Reports for March 26, 1915 (page 893-923), presents a comparative analysis of the more important requirements embodied in the existing Federal and state laws that are designed to restrict or to regulate the distribution and use of opium, coca and other narcotic or habit-forming drugs. This analysis shows that even at the present time a number of the state laws include requirements similar to those embodied in the Federal law and to this extent duplicate that law and subject the individual found guilty of non-compliance to double punishment. On the other hand the existing state laws,